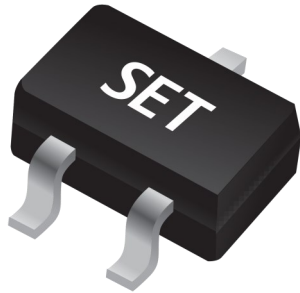


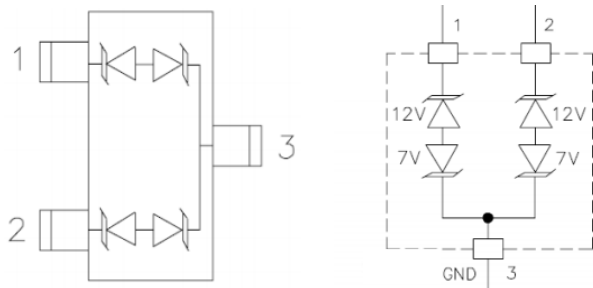
# ESD Protection Diodes

Asymmetrical Transient Voltage Protection for Extended Common-Mode RS-485

SD71217T23G SOT23



## Pinout and Functional Block Diagram



## Applications

- Protection of RS-485 transceivers with extended common-mode range
- Security systems
- Automatic Teller Machines
- HFC systems
- Networks

## Order Information

Type	Package	Marking Code	Delivery Form	Delivery Quantity
SD71217T23G	SOT23	712 or C72	7" T&R	3000 PCS

## Description

The SD71217T23G transient voltage suppressor (TVS) diode is designed for asymmetrical (12 V to -7 V) protection in multi-point data transmission standard RS-485 applications. SD71217T23G may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (FET), and lightning.

The SD71217T23G features 400 Watts ( $t_p=8 / 20 \mu s$ ) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. This provides higher equipment reliability and eliminates the "guess work" required when using zener diodes that are not rated to handle such transient conditions. The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the SD71217T23G minimizes the stress on the protected transceiver. The SOT-23 package allows flexibility in the design of "crowded" circuit boards.

## Features

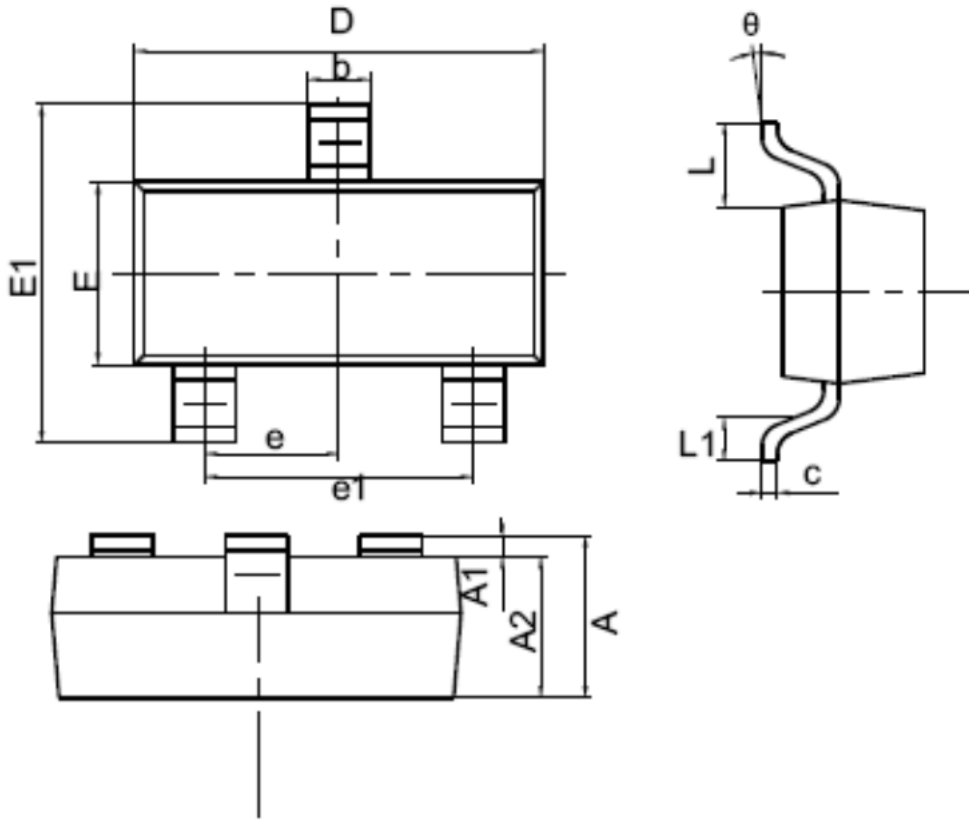
- Peak Power Dissipation: 400 W@8 / 20  $\mu s$
- Transient Protection for Asymmetrical Data Lines to
- IEC 61000-4-2 (ESD)  $\pm 15$  kV(Air),  $\pm 8$  kV(Contact)
- IEC 61000-4-4 (FET) 40 A (5 / 50 ns)
- IEC 61000-4-5 (Lightning) 12 A (8 / 20  $\mu s$ )
- Protects Two +12 V to -7 V Lines
- Low Clamping Voltage
- Low Leakage Current
- High Temperature Soldering Guaranteed: 260 °C / 10 sec
- High Temperature to Reflow Soldering Guaranteed: 260 °C / 10 sec
- MSL1
- Flammability Rating: UL 94 V-0
- Halogen Free and RoHS Compliant

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SD71217T23G SOT23

## Package Dimensions - SOT23



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 Ref.		0.037 Ref.	
e1	1.800	2.000	0.071	0.079
L	0.550 Ref.		0.022 Ref.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

# ESD Protection Diodes

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## Limiting Values

(T<sub>A</sub> = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>ESD</sub>	Electrostatic Discharge Voltage	IEC 61000-4-2; Contact Discharge	-	8	kV
		IEC 61000-4-2; Air Discharge	-	15	kV
P <sub>PP</sub>	Peak Pulse Power (8 / 20 μs)	-	-	400	W
T <sub>A</sub>	Operating Temperature Range	-	-55	150	°C
T <sub>stg</sub>	Storage Temperature Range	-	-55	150	°C

## Electrical Characteristics

(T<sub>A</sub> = 25 °C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Pin 1 to 3 and Pin 2 to 3 (12 V TVS)			Pin 3 to 1 and Pin 3 to 2 (5 V TVS)			Unit
			Min	Typ	Max	Min	Typ	Max	
V <sub>RWM</sub>	Reverse Working Voltage	Pin 3 to 1 or Pin 2 to 1	-	-	12	-	-	7	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1 mA	13.3	-	-	7.5	-	-	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 12 V / 5 V	-	-	1.0	-	-	20	μA
V <sub>C1</sub>	Clamping Voltage 1	I <sub>PP</sub> = 5 A, t <sub>p</sub> = 8 / 20 μs	-	-	20	-	-	10	V
V <sub>C2</sub>	Clamping Voltage 2	I <sub>PP</sub> = 17 A, t <sub>p</sub> = 8 / 20 μs	-	-	26	-	-	12	V
C <sub>J1</sub>	Junction Capacitance 1	V <sub>R</sub> = 0 V, Measured at 1 MHz	-	-	75	-	-	75	pF
C <sub>J2</sub>	Junction Capacitance 2	V <sub>R</sub> = 5 / 12 V, Measured at 1 MHz	-	45	-	-	45	-	pF

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## Performance Curve for Reference

( $T_A=25\text{ }^\circ\text{C}$  unless otherwise noted)

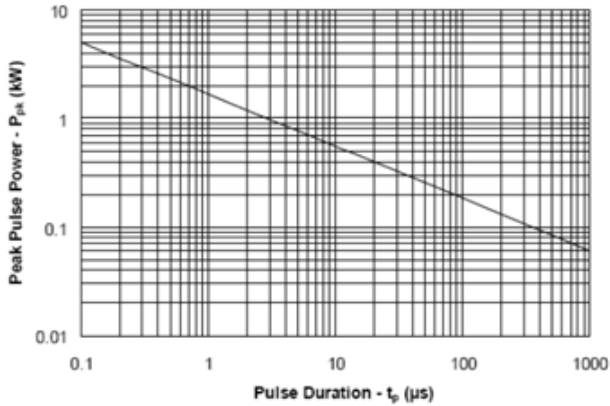


FIGURE 1

Non-Repetitive Peak Pulse Power VS. Pulse Time

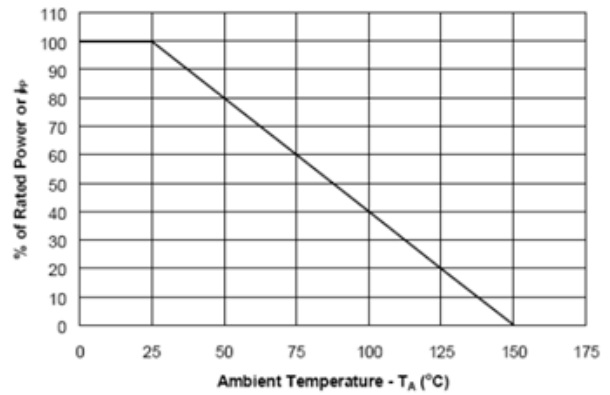


FIGURE 2

Power Derating Curve

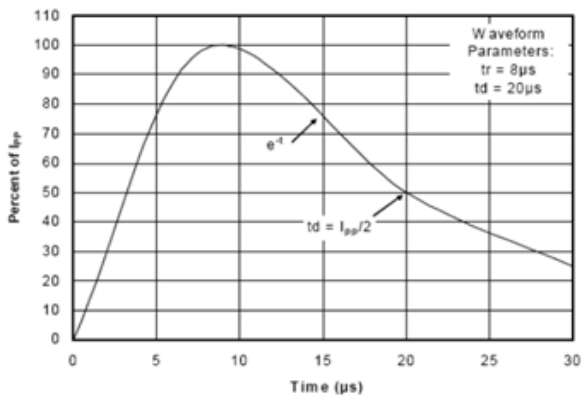


FIGURE 3

Pulse Waveform

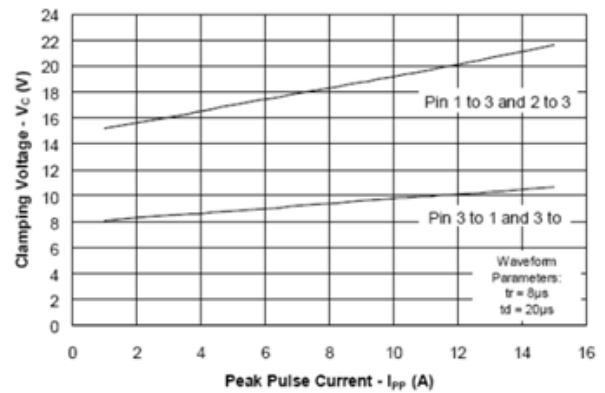


FIGURE 4

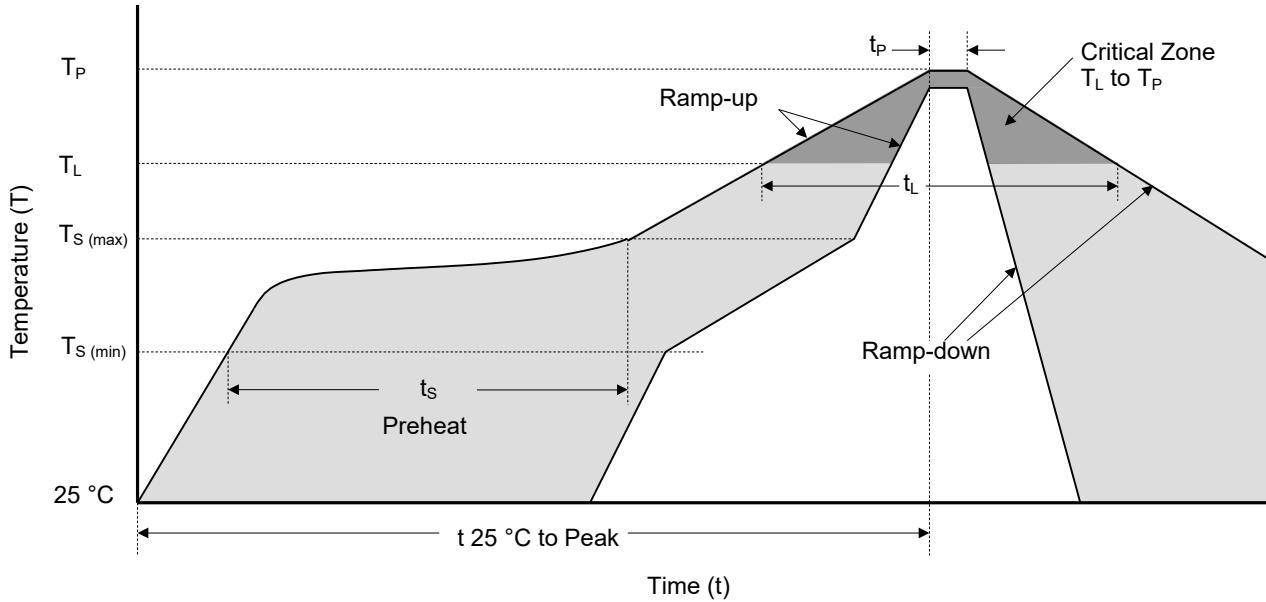
Clamping Voltage VS. Peak Pulse Current

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## Soldering Parameters



Reflowing Condition

Reflow Soldering Parameters		Lead-Free Assembly
Pre-heat	Temperature Min ( $T_{S (min)}$ )	150 °C
	Temperature Max ( $T_{S (max)}$ )	200 °C
	Time (min to max) ( $t_s$ )	60 ~ 120 seconds
Average Ramp Up Rate (Liquidus Temp ( $T_L$ ) to Peak)		3 °C / second max.
$T_S (max)$ to $T_L$ Ramp-up Rate		3 °C / second max.
Reflow	Temperature ( $T_L$ ) (Liquidus)	217 °C
	Time (min to max) ( $t_L$ )	60 ~ 150 seconds
Peak Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °C
Time of within 5 °C of Actual Peak Temperature ( $t_p$ )		20 ~ 40 seconds
Ramp-down Rate		6 °C / second max.
Time from 25 °C to Peak Temperature		8 Minutes max.
Do Not Exceed		260 °C



# ATTENTION

## Usage

1. TVS must be operated in the specified ambient temp.
2. Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

## Replacement

1. If TVS is visually damaged, please replace it.
2. TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

## Storage

1. Storage Temp. Range: (-55 to 150) °C.
2. Do not store the TVS at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder-ability of the lead wires. The product shall be used up within 1 year after receiving the goods.

## Environmental Conditions













































1. TVS should not be exposed to the open air, nor direct sunshine.
2. TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. TVS should avoid sand dust, salt mist, or other harmful gases.

## Max. Typical Capacitance of TVS

The typical capacitance of TVS is listed in the specifications. Designers may refer to it when designing TVS in High frequency circuit.

## Installation Mechanical Stress

1. Do not knock TVS when installing, to avoid mechanical damage.
2. Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.

Package Outline					Circuit Diagram					
										
DFN0603	DFN1006	DFN1006-3L	DFN1610	DFN2020-3L	1CH/UNI	1CH/BI	2CH/UNI	2CH/BI	1CH/BI	1CH/UNI
										
DFN1610-6L	DFN2010-8L	DFN2510	DFN2626-10L	DFN3810-9L	1CH/UNI	1CH/BI	1CH/UNI	1CH/BI	2CH/UNI	2CH/BI
										
SOD-923	SOD-523	SOD-323	SOD-123	SOT-143	1CH/UNI	2CH/UNI	2CH/UNI	4CH/UNI	5CH/UNI	4CH/UNI
										
SOT-523	SOT-323	SOT-23	SOT-363	SOT-23-6L	2CH/BI	4CH/UNI	4CH/UNI	8CH/UNI	8CH/UNI	8CH/UNI